

Appl. Ser. No. 10/620,197
Response May 27, 2004
Reply to Office Action of April 16, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended): A heater chip for an inkjet printhead, comprising:
 - a substrate;
 - a resistor layer on the substrate having a resistor thickness and a resistor width defining a heater width;
 - a conductor layer on the resistor layer defining a heater length; and
 - an overcoat layer having an overcoat thickness on the resistor layer, the overcoat thickness and the resistor thickness defining a heater thickness wherein the heater length multiplied by the heater width is in a range from about 50 to about 100 micrometers squared and the heater thickness is in a range from about 500 to less than 1100 ~~about 1000~~ angstroms.
2. (Currently Amended): A heater chip for an inkjet printhead, comprising:
 - a substrate;
 - a resistor layer on the substrate having a resistor thickness and a resistor width defining a heater width;
 - a conductor layer on the resistor layer defining a heater length; and
 - an overcoat layer having an overcoat thickness on the resistor layer, the overcoat thickness and the resistor thickness defining a heater thickness wherein the heater length multiplied by the heater width is in a range from about 100 to about 150 micrometers squared and the heater thickness is in a range from about 500 to less than 1100 ~~about 1000~~ angstroms.
3. (Currently Amended): A heater chip for an inkjet printhead, comprising:
 - a substrate;

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a resistor layer on the substrate having a resistor thickness and a resistor width defining a heater width;

a conductor layer on the resistor layer defining a heater length; and

an overcoat layer having an overcoat thickness on the resistor layer, the overcoat thickness and the resistor thickness defining a heater thickness wherein the heater length multiplied by the heater width is in a range from about 150 to about 200 micrometers squared and the heater thickness is in a range from about 500 to less than 1100 ~~about 1000~~ angstroms.

4. (Currently Amended): A heater chip for an inkjet printhead, comprising:

a substrate;

a resistor layer on the substrate having a resistor thickness and a resistor width defining a heater width;

a conductor layer on the resistor layer defining a heater length; and

an overcoat layer having an overcoat thickness on the resistor layer, the overcoat thickness and the resistor thickness defining a heater thickness wherein the heater length multiplied by the heater width is in a range from about 200 to about 250 micrometers squared and the heater thickness is in a range from about 500 to less than 1100 ~~about 1000~~ angstroms.

5. (Currently Amended): A heater chip for an inkjet printhead, comprising:

a substrate;

a resistor layer on the substrate having a resistor thickness and a resistor width defining a heater width;

a conductor layer on the resistor layer defining a heater length; and

an overcoat layer having an overcoat thickness on the resistor layer, the overcoat thickness and the resistor thickness defining a heater thickness wherein the heater length multiplied by the heater width is in a range from about 250 to about 300 micrometers squared and the heater thickness is in a range from about 500 to less than 1100 ~~about 1000~~ angstroms.

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6. (Currently Amended): A heater chip for an inkjet printhead, comprising:
 - a substrate;
 - a resistor layer on the substrate having a resistor thickness and a resistor width defining a heater width;
 - a conductor layer on the resistor layer defining a heater length; and
 - an overcoat layer having an overcoat thickness on the resistor layer, the overcoat thickness and the resistor thickness defining a heater thickness wherein the heater length multiplied by the heater width is in a range from about 300 to about 350 micrometers squared and the heater thickness is in a range from about 500 to less than 1100 ~~about 1000~~ angstroms.
7. (Currently Amended): A heater chip for an inkjet printhead, comprising:
 - a substrate;
 - a resistor layer on the substrate having a resistor thickness and a resistor width defining a heater width;
 - a conductor layer on the resistor layer defining a heater length; and
 - an overcoat layer having an overcoat thickness on the resistor layer, the overcoat thickness and the resistor thickness defining a heater thickness wherein the heater length multiplied by the heater width is in a range from about 350 to less than 400 ~~about 400~~ micrometers squared and the heater thickness is in a range from about 500 to less than 1100 ~~about 1000~~ angstroms.
8. (Currently Amended): A heater chip for an inkjet printhead, comprising:
 - a substrate;
 - a resistor layer on the substrate having a resistor thickness and a resistor width defining a heater width;
 - a conductor layer on the resistor layer defining a heater length; and
 - an overcoat layer having an overcoat thickness on the resistor layer, the overcoat thickness and the resistor thickness defining a heater thickness wherein the heater length multiplied by the heater width is in a range from about 50 to less than 400 ~~about 350~~ micrometers squared and the heater thickness is in a range from about

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500 to less than 1100 ~~about 1000~~ angstroms wherein an energy to emit an ink drop from the heater chip during use is in a range from about 0.007 to about 0.16 ~~0.14~~ microjoules.

9. (Currently Amended): A heater chip for an inkjet printhead, comprising:
 - a substrate having a plurality of thin film layers thereon; and
 - a plurality of heaters defined by some of the plurality of thin film layers, at least one of the plurality of heaters having a heater area in a range from about 50 to less than 400 ~~about 250~~ micrometers squared and a heater thickness in a range from about 500 to less than 1100 ~~about 6000~~ angstroms.
10. (Currently Amended): The heater chip of claim 9, wherein an energy to emit a drop of ink from the at least one of the plurality of heaters during use is in a range from about 0.007 to about 0.176 ~~0.6~~ microjoules.
11. (Currently Amended): A heater chip for an inkjet printhead, comprising:
 - a substrate having a plurality of thin film layers thereon; and
 - a plurality of heaters defined by some of the plurality of thin film layers, each heater of said plurality of heaters having a heater thickness and heater area wherein the heater area is less than 400 ~~about 250~~ micrometers squared and the heater thickness is in a range from about 500 to less than 1100 ~~about 6000~~ angstroms.
12. (Currently Amended): The heater chip of claim 11, wherein an energy to emit a drop of ink from said each heater during use is in a range from about 0.007 to about 0.176 ~~0.6~~ microjoules.
13. (Previously Presented): The heater chip of claim 11, wherein the plurality of thin film layers include a resistor layer and a conductor layer on the resistor layer.
14. (Previously Presented): The heater chip of claim 13, wherein the conductor layer

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has an anode and a cathode, a distance between the anode and cathode on a surface of the resistor layer defining a heater length of said heater area.

15. (Previously Presented): The heater chip of claim 11, wherein the plurality of thin film layers include a resistor layer and an overcoat layer on the resistor layer.

16. (Previously Presented): The heater chip of claim 15, wherein a thickness of the resistor layer and a thickness of the overcoat layer define said heater thickness.

17. (Previously Presented): The heater chip of claim 15, wherein the overcoat layer further includes a passivation layer and a cavitation layer.

18. (Previously Presented): The heater chip of claim 15, wherein the overcoat layer further includes one of a silicon nitride, a silicon carbide and a diamond like carbon layer.

19. (Previously Presented): The heater chip of claim 11, wherein the plurality of thin film layers include a resistor layer.

20. (Previously Presented): The heater chip of claim 19, wherein a width of the resistor layer defines a heater width of said heater area.